

Skills Worksheet

Directed Reading**Section: Energy and Living Things**

In the space provided, write the letter of the description that best matches the term or phrase.

- | | |
|-------------------------------|--|
| _____ 1. photosynthesis | a. building molecules that can be used as an energy source, or breaking down molecules in which energy is stored |
| _____ 2. autotroph | b. the process by which light energy is converted to chemical energy |
| _____ 3. heterotroph | c. an organism that uses sunlight or inorganic substances to make organic compounds |
| _____ 4. cellular respiration | d. an organism that consumes food to get energy |
| _____ 5. metabolism | e. the process of getting energy from food |

Study the following steps in the flow of energy through living systems. Determine the order in which the steps take place. Write the number of each step in the space provided.

- _____ 6. Animals eat plants to get energy.
- _____ 7. Plants absorb sunlight.
- _____ 8. Plants use chemical energy to make organic compounds.
- _____ 9. Light from the sun reaches Earth.
- _____ 10. Plants convert sunlight to chemical energy.

Read each question, and write your answer in the space provided.

11. What is the difference between cellular respiration and getting energy from a log by burning it?

Name _____ Class _____ Date _____

Directed Reading *continued*

12. Why is ATP called an “energy currency”?

13. How is energy released from ATP?

14. How is ATP important to cell metabolism?

Skills Worksheet

Directed Reading

Section: Photosynthesis

Study the following stages of photosynthesis. Determine the order in which the stages take place. Write the order of each stage in the space provided.

- _____ 1. Energy stored in ATP and NADPH powers the formation of organic compounds, using carbon dioxide.
- _____ 2. Energy is captured from sunlight.
- _____ 3. Light energy is converted to chemical energy, which is temporarily stored in ATP and NADPH.

Read each question, and write your answer in the space provided.

4. Where does the energy for human metabolism come from?

5. Write the chemical equation that is used to summarize photosynthesis.

Complete each statement by writing the correct term or phrase in the space provided.

6. Light-absorbing substances are called _____.
7. Pigments found in plants include chlorophyll *a*, chlorophyll *b*, and _____.
8. Electrons that leave chlorophyll molecules are replaced by electrons from split _____ molecules.
9. ATP and _____ are produced in the second stage of photosynthesis.
10. The series of molecules through which excited electrons are passed down a thylakoid membrane is called a(n) _____ chain.

Name _____ Class _____ Date _____

Directed Reading *continued*

11. ATP is made from ADP by adding a(n) _____ group to a molecule of ADP.

Read each question, and write your answer in the space provided.

12. What is the role of the Calvin cycle in photosynthesis?

13. What are three environmental factors that affect photosynthesis?

Skills Worksheet

Directed Reading

Section: Cellular Respiration

Complete each statement by writing the correct term or phrase in the space provided.

1. Cells harvest the energy in organic compounds to make ATP through a process called _____.
2. Metabolic processes that require oxygen are called _____ processes.
3. The breakdown of glucose to pyruvate is called _____.
4. The primary fuel for cellular respiration is _____.
5. In the first stage of cellular respiration, glucose is broken down to _____.

Read each question, and write your answer in the space provided.

6. How is acetyl-CoA produced?

7. What are the products of the electron transport chain in the second stage of cellular respiration?

Directed Reading *continued*

Complete each statement by writing the correct term or phrase in the space provided.

8. When oxygen is not present, the _____
_____ does not function.
9. Two types of fermentation are _____ and
_____ fermentation.
10. The role of fermentation in cellular respiration is to recycle
_____.

Read each question, and write your answer in the space provided.

11. What causes muscle soreness during exercise?

12. Why do cells produce more ATP under aerobic conditions than under anaerobic conditions?

Answer Key

Directed Reading

SECTION: ENERGY AND LIVING THINGS

1. b
2. c
3. d
4. e
5. a
6. 5
7. 2
8. 4
9. 1
10. 3
11. During cellular respiration, stored chemical energy is released gradually in a series of enzyme-assisted reactions. When a log is burned, stored chemical energy is released quickly as heat and light.
12. ATP is called an energy currency because cells can "spend it" in order to carry out cellular processes that require energy.
13. Energy is released from an ATP molecule when a phosphate group is removed from the molecule, forming an ADP molecule.
14. Many of the chemical reactions of metabolism require energy. The breakdown of ATP into ADP and phosphate groups releases energy in a way that cells can use it for metabolism.

SECTION: PHOTOSYNTHESIS

1. 3
2. 1
3. 2
4. Almost all of the energy we use comes from plants, which get their energy directly from sunlight.
5. $3\text{CO}_2 + 3\text{H}_2\text{O} \rightarrow \text{C}_3\text{H}_6\text{O}_3 + 3\text{O}_2$
6. pigments
7. carotenoids
8. water
9. NADPH
10. electron transport
11. phosphate

12. The Calvin cycle uses carbon dioxide from the air, energy from ATP, and electrons from NADPH to produce organic compounds. Some of the three-carbon sugar molecules made by the Calvin cycle are used to make other substances needed for energy and growth. The other three-carbon sugar molecules are used to regenerate the five-carbon starting compound and continue the cycle.
13. light intensity, carbon dioxide concentration, and temperature

SECTION: CELLULAR RESPIRATION

1. cellular respiration
2. aerobic
3. glycolysis
4. glucose
5. pyruvate
6. Pyruvate produced during glycolysis enters a mitochondrion and breaks down into a carbon dioxide molecule and a two-carbon acetyl group. The acetyl group attaches to a coenzyme A molecule, forming acetyl-CoA.
7. water and a large amount of ATP
8. electron transport chain
9. alcoholic, lactic acid
10. NAD^+
11. When muscle cells do not get enough oxygen, pyruvate is converted to lactate, which can build up in the muscle cells and cause soreness.
12. The electron transport chain, which produces a large amount of ATP, operates under aerobic conditions but not under anaerobic conditions.

Active Reading

SECTION: ENERGY AND LIVING THINGS

1. a putting together of substances, including substances found in light energy, to form chemical energy
2. capable of producing organic compounds, or food, from within itself